

WHAT IS CLAIMED IS:

1. A reactive dye compound comprising:

- (a) at least one chromophore moiety;
- (b) at least one nitrogen-containing heterocycle
- (c) a linking group to link each chromophore moiety to each nitrogen-containing heterocycle;

characterised in that at least one nitrogen-containing heterocycle is substituted with at least one Y group wherein Y is derived from a hydrated aldehyde, a hydrated ketone, a hydrated alpha-hydroxy ketone, or the hydrated form of formic acid and linked via one of its oxygen atoms to the nitrogen-containing heterocycle thereby forming a hemiacetal.

2. A reactive dye compound according to Claim 1 wherein Y is derived from a hydrated form of an aldehyde or ketone or the hydrated form of formic acid.

Sub A1 3. A reactive dye compound according to Claim 1 or 2 wherein Y is derived from the hydrated form of a reducing sugar selected from an aldose or a ketose, or the hydrated form of formic acid.

4. A reactive dye compound according to Claim 3 wherein said aldose is selected from an aldotriose, an aldotetrose, an aldopentose, an aldohexose, an aldohexose and an aldooctose, and mixtures thereof.

5. A reactive dye compound according to Claim 4 wherein said aldose is an aldopentose selected from ribose, xylose, arabinose, deoxyribose and fructose, and mixtures thereof.

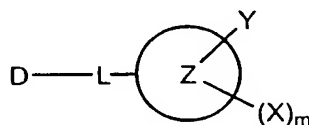
6. A reactive dye compound according to Claim 5 wherein said aldose is an aldohexose selected from glucose, galactose, talose, mannose, altrose, allose and rhamnose, and mixtures thereof.
7. A reactive dye compound according to any of Claims 1 to 6 wherein Y is derived from glucose, sucrose or fructose or the hydrated form of formic acid.
8. A reactive dye compound according to Claim 3 wherein said ketose is selected from an aldotetrulose, an aldopentulose, an aldohexulose, an aldoheptulose, and an aldooctulose, and mixtures thereof.
9. A reactive dye compound according to any of Claims 1 to 8 wherein Y is -O-(CHOH)₄(CHOHCH₂OH).
10. A reactive dye compound according to any of Claims 1 to 9 wherein the nitrogen-containing heterocycle is selected from triazine, pyrimidine, quinoxaline, phthalazine, pyridazone and pyrazine.
11. A reactive dye compound according to any of Claims 1 to 10 wherein the nitrogen-containing heterocycle is selected from triazine, pyrimidine or quinoxaline.
12. A reactive dye compound according to any of Claims 1 to 12 wherein the nitrogen-containing heterocycle is selected from triazine and pyrimidine.
13. A reactive dye compound according to any of Claims 1 to 12 wherein the linking group is selected from NR, N(C=O)R, N(SO₂)R where R is selected from H or C1-C4 alkyl which can be substituted by halo, hydroxy, cyano, C1-C4 alkoxy, C2-C5 alkoxycarbonyl, carboxyl, sulfamoyl, sulfo and sulfato.

14. A reactive dye compound according to Claim 13 wherein the linking group is NR.

Sub A4 15. A reactive dye compound according to Claim 14 wherein R is H or C1-C4 alkyl, preferably H.

16. A reactive dye compound according to any of Claims 1 to 15 wherein the nitrogen-containing heterocycle is additionally substituted with one or more X substituents, wherein X is independently selected from Y, thio-derivatives, halogen (preferably fluorine and chlorine), amines, alkoxy groups, carboxylic acid groups, CN, N₃, quaternized nitrogen derivatives, Q⁺, and oxy- or thio- carbonyl derivatives having the formula -A(CO)R* wherein A is selected from O or S, where R* is an organic residue which contains at least one nucleophilic group, wherein the nucleophilic group is preferably selected from OH, NH₂, SH, COOH, -N=, NHR¹ and NR¹R² wherein R¹ and R² may be the same or different and may be selected from C₁-C₄ alkyl, preferably Y or halogen.

17. A reactive dye having the formula (I):



wherein D is a chromophore group

L, Z, Y, X are as defined above and m is an integer of from 1 to 4;

and salts and esters thereof.

Sub A5 18. Use of a compound according to any of Claims 1 to 17 for dyeing cellulosic substrates, preferably cotton.

19. Use of a compound according to any of Claims 1 to 17 for dyeing wool.

Sub A5 20. Use of a compound according to any of Claims 1 to 17 for dyeing polyamide substrates, preferably nylon.

21. Use of a compound according to any of Claims 1 to 17 for dyeing silk.

22. Use of a compound according to any of Claims 1 to 17 for dyeing keratin, preferably hair.

23. Use of a compound according to any of Claims 1 to 17 for dyeing leather.

24. Process for the preparation of a compound according to any of Claims 1 to 17 comprising the steps of reacting a first starting material with a second starting material, the first starting material comprising at least one chromophore, at least one nitrogen-containing heterocycle linked to the chromophore via a linking group L, the second starting material being a compound containing a Y group, preferably the hydrated form of a reducing sugar or the hydrated form of formic acid.

25. Process according to Claim 24 wherein the reducing sugar is selected from sucrose, glucose and mixtures thereof.

Sub A6 26. Process according to Claim 24 or 25 wherein the process is carried out at a pH of from about 2 to about 8, preferably from about 3 to about 5.

27. Process according to any of Claims 24 to 26 wherein the second starting material is added to the first starting material slowly, preferably dropwise, preferably over several hours, preferably 1 to 5 hours, more preferably 1 to 3 hours.

28. Product obtainable by the process according to any of Claims 24 to 27.

29. A dye composition comprising the compound of any of Claims 1 to 17 or the product of any of Claims 24 to 28.

30. A dye composition according to Claim 29 wherein the composition is in the form of a solid mixture and further comprises an acid or neutral buffer.
31. A dye composition according to Claim 29 wherein the composition is in the form of a liquid and further comprises water and an acid or neutral buffer.
32. A dye composition according to Claim 29 wherein the composition is in the form of a paste and further comprises water, thickening agent and an acid or neutral buffer.
- Sub 97* 33. A dye composition according to Claim 29, 30, or 32 wherein the pH of the composition is in the range of from about 2 to about 5, preferably from about 2 to about 3 when an acidic buffer is present, and in the range of from about 4 to about 8, preferably from about 6 to about 8 when a neutral buffer is present.